

**ARIZONA DEPARTMENT OF HEALTH SERVICES
BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM
UNIVERSITY OF ARIZONA CENTER FOR RURAL HEALTH**



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**ENHANCING ARIZONA'S TRAUMA CENTERS
PERFORMANCE MEASURES:
EMERGENCY DEPARTMENT DWELL TIME
2014**

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Purpose:

The purpose of this report is to provide Arizona's Level IV Trauma Centers with information on reducing the time to transfer a trauma patient.

This report targets the first of four trauma system performance measures:

1. **Reduce the Emergency Department (ED) dwell time for transferred patients,**
2. Reduce the number of transfers after admissions,
3. Reduce the number of deaths at non trauma centers,
4. Increase trauma billing efficiency.

Methodology:

The Arizona Department of Health Services (ADHS)- Bureau of Emergency Medical Services and Trauma System (BEMSTS) and the University of Arizona- Center for Rural Health developed a prospective study on factors that resulted in extended ED dwell times in Arizona's Level IV Trauma Centers.

Data was collected by Level IV Trauma Centers for transfers that occurred in January 1, 2014 through June 30, 2014. A form was designed to capture twenty-nine data elements; twenty of which were related to date/time. Time intervals were calculated to understand the effect of internal processes on trauma patient transfers.

Level IV Trauma Centers voluntarily submitted paper forms which were then entered into an Access database. Overall, there were 282 cases from 13 of the 26 Level IV Trauma Centers in the state. All regions of the state were represented. Data analysis utilized version 9.2 of the Statistical Analysis Software (SAS).

Limitations:

The data in the report is not a complete representative of Arizona Level IV Trauma Centers. Trauma centers with a low number of cases are advised to collect more cases prior to making any changes or decisions.

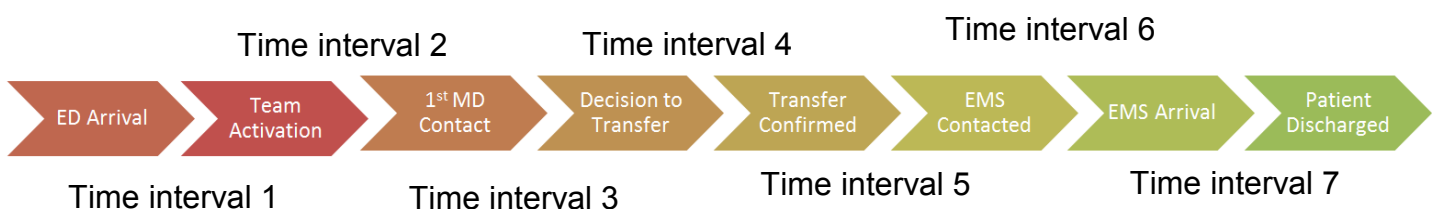


Table 1: Trauma transfers by region

	N	%
Central	69	24.4%
Northern	103	36.5%
Southeast	47	16.6%
Western	63	22.3%
Total cases	282	100%

Table 2: Dwell time by region (hours)

	25th percentile	Median	75th percentile	Max
Central	3	4	5	29
Northern	2	3	4	12
Southeast	2	3	4	7
Western	2	3	4	8
Overall	2	3	4	29

There were a total of 282 cases collected from all regions in Arizona. The Northern Region (36.5%) provided the most cases, followed by Central Region (24.4%).

Of the 282 cases, only 97 (34.3%) met the previously established target goal for transferring patients to a Level I Trauma Center within 2 hours. The analysis compares time intervals between two groups:

- On-target: transferred in less than 2 hours (≤ 2),
- Off-target: transferred in more than 2 hours (> 2).

The median dwell time for the state was 3 hours . Only the Central Region differed with a dwell time of 4 hours.

Graph 1: Proportion of success by region

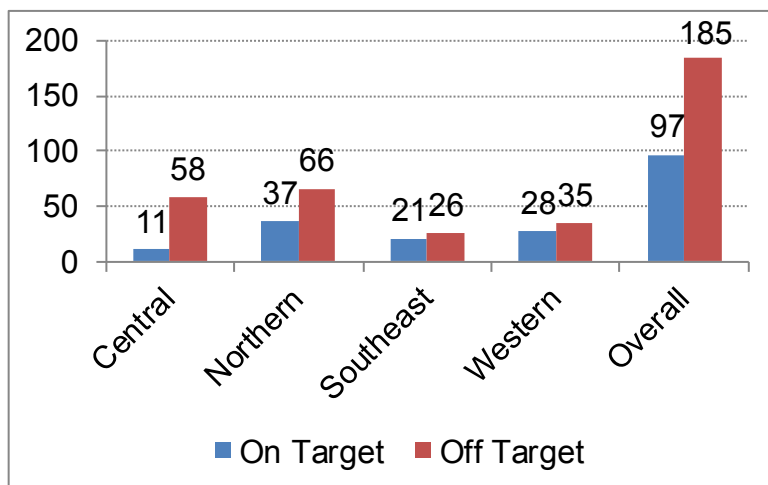
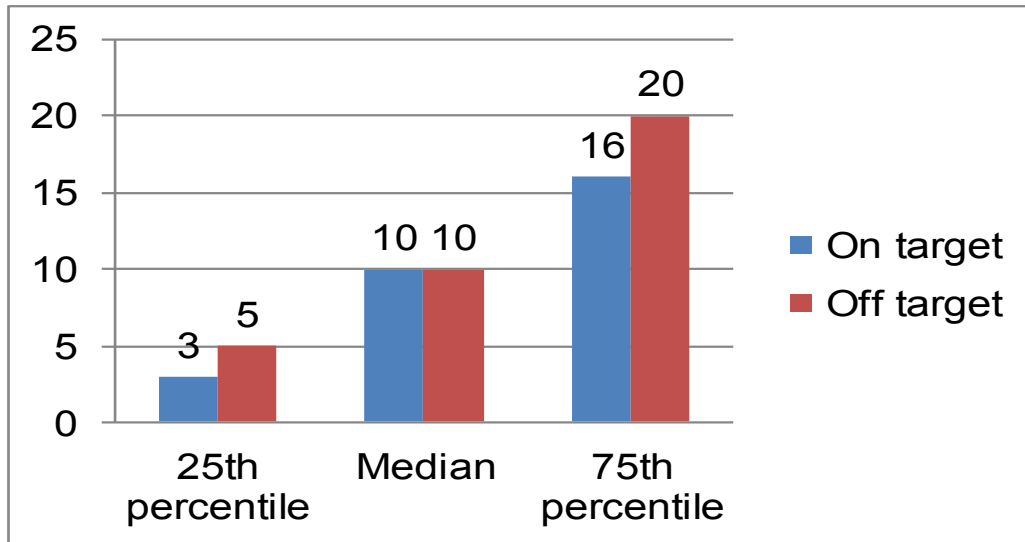


Table 3: Proportion of success by region

	On target		Off target	
	N	%	N	%
Central	11	15.9%	58	84%
Northern	37	35.9%	66	64%
Southeast	21	44.6%	26	55.3%
Western	28	44.4%	35	55.5%
Overall	97	34.3%	185	65.6%

The Western and Southeastern regions had the greatest number of transfers under 2 hours. Despite the number of Level I Trauma Centers, the Central Region met the target goal the least.

Graph 2: Patient arrival to trauma team activation (minutes) (N=186)



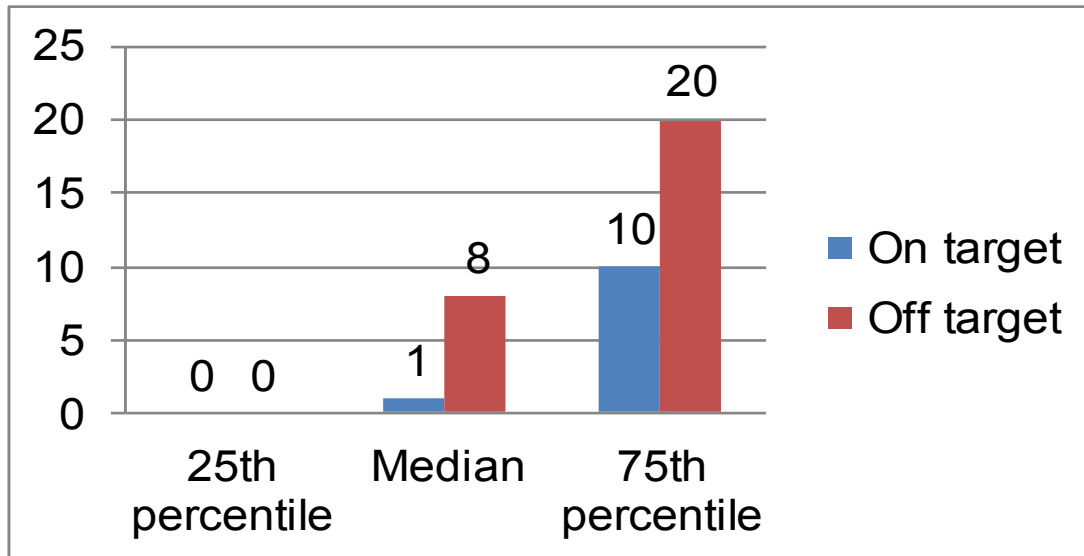
While the median time of the first time interval (ED arrival to trauma team activation) was 10 minutes for both groups, the results varied slightly. In 75% of the On target group, facilities took 16 minutes or less to activate. In the 75% of the cases in the Off target group, a trauma team activation took 20 minutes. This measure was restricted to only include cases in which a trauma team activation occurred.

Table 4: Patient arrival to trauma team activation (minutes) (N=186)

	Trauma team activations	Missing	25th percentile	Median	75th percentile	Max
On target	78	19	3	10	16	90
Off target	108	18	5	10	20	191

Level IV Trauma Centers should educate and monitor staff usage of activations. Proper utilization of activations will result in a coordinated effort that leads to improvements in patient care.

Graph 3: Patient arrival to first physician contact (minutes) (N=282)



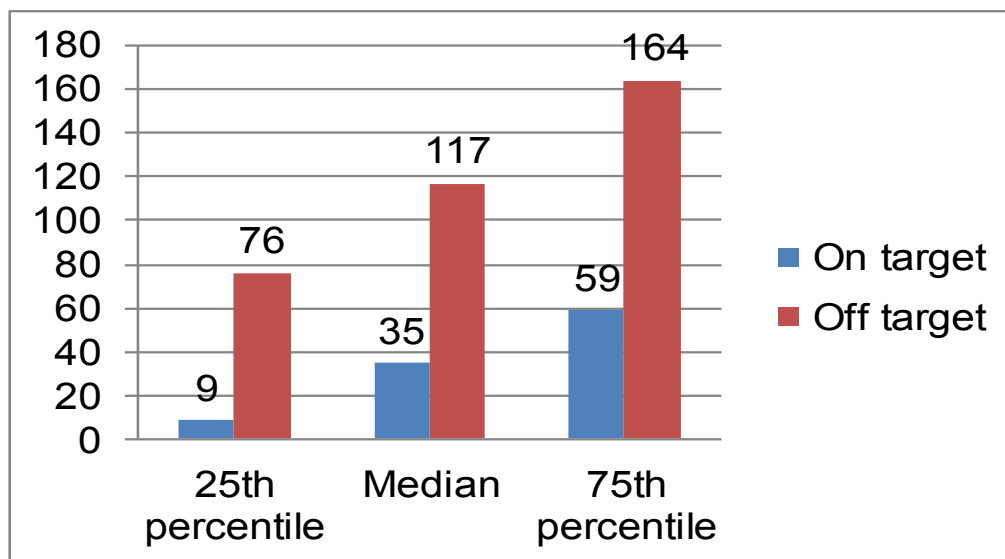
Physician contact time was noticeably different between the On target and Off target groups. When patients were transferred under the target goal of 2 hours, the median for the first physician contact time occurred in 1 minute. For patients that failed to meet the target goal, the median time interval was 8 minutes.

Table 5: Patient arrival to first physician contact (minutes) (N=282)

	Total cases	Missing	25 th percentile	Median	75 th percentile	Min	Max
On target	97	8	0	1	10	-19	68
Off target	185	19	0	8	20	-1,079	205

Physician contact time was missing in 10% of cases in the Off target group. Physician contact times of ten minutes or less are associated with a dwell time that meets the target goal of 2 hours.

Graph 4: Physician contact to decision time (minutes) (N=282)



The greatest variability between the On and Off target groups was the time interval between the first physician contact to their decision to transfer. When ED dwell times exceeded 2 hours, physicians required more time to determine a transfer was needed.

In 75% of the Off target cases, physicians made their decision in 164 minutes or less. In the On target cases, 75% had a physician decision to transfer in 59 minutes or less.

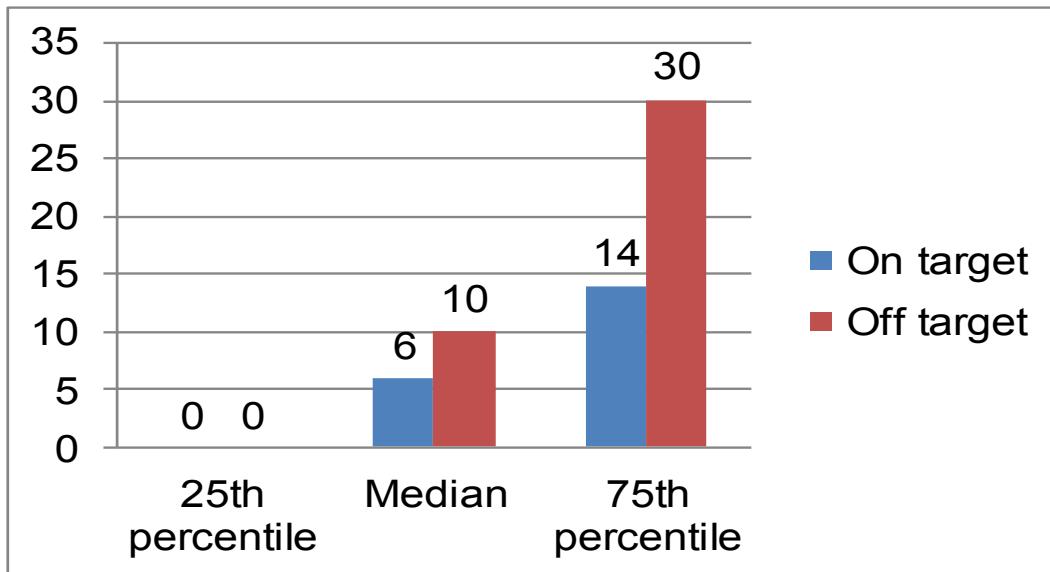
This time interval captures essential testing and patient care. However, if facilities focus on quick and effective decision in this interval they will improve their ED dwell times.

Table 6: Physician contact to decision time (minutes) (N=282)

	Total cases	Physician contact/ decision date/time missing	25th percentile	Median	75th percentile	Min	Max
On target	97	16	9	35	59	-29	113
Off target	185	31	76	117	164	-32	805

Level IV Trauma Centers should work with their internal staff and receiving facilities to determine which patients should be transferred quickly and which should be treated on site.

Graph 5: First attempt to confirm transfer (minutes) (N=282)



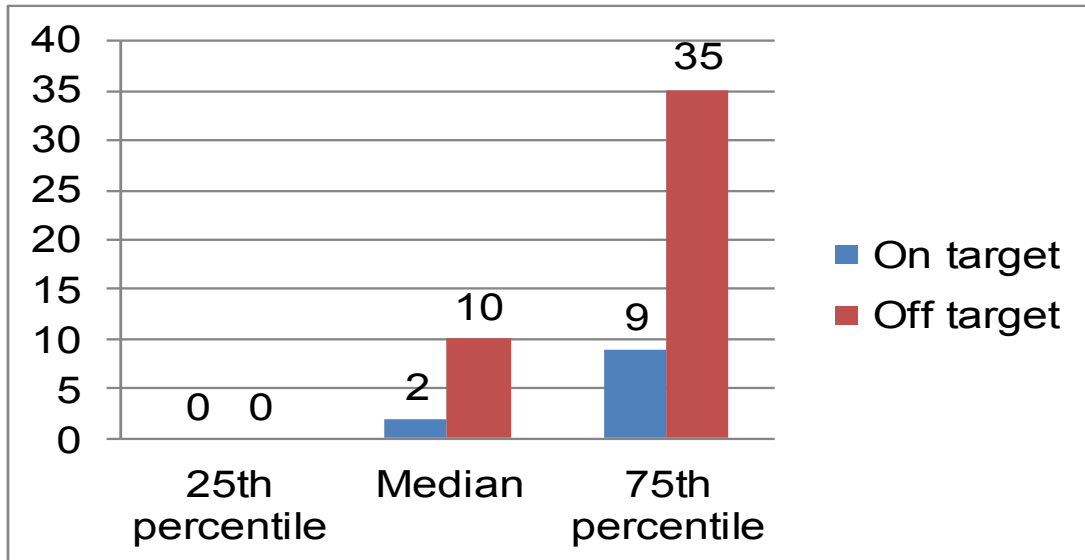
In 75% of the On target cases, the receiving trauma center confirmed availability in 14 minutes. In 75% of the Off target cases, the receiving trauma center required 30 minutes to confirm availability. Data was missing in 36% of the On target group and 32% in the Off target group.

Table 7: First attempt to confirm transfer (minutes) (N=282)

	Total cases	Missing	25th percentile	Median	75th percentile	Min	Max
On target	97	35	0	6	14	-45	69
Off target	185	60	0	10	30	0	133

Transferring facilities should consider having transfer plans with more than one Level I Trauma Center. A decision schematic can help staff determine the best hospital and method of transport in cases of severe weather, diversions, and other extenuating circumstances.

Graph 6: Transfer confirmation to EMS contact time (minutes) (N=282)



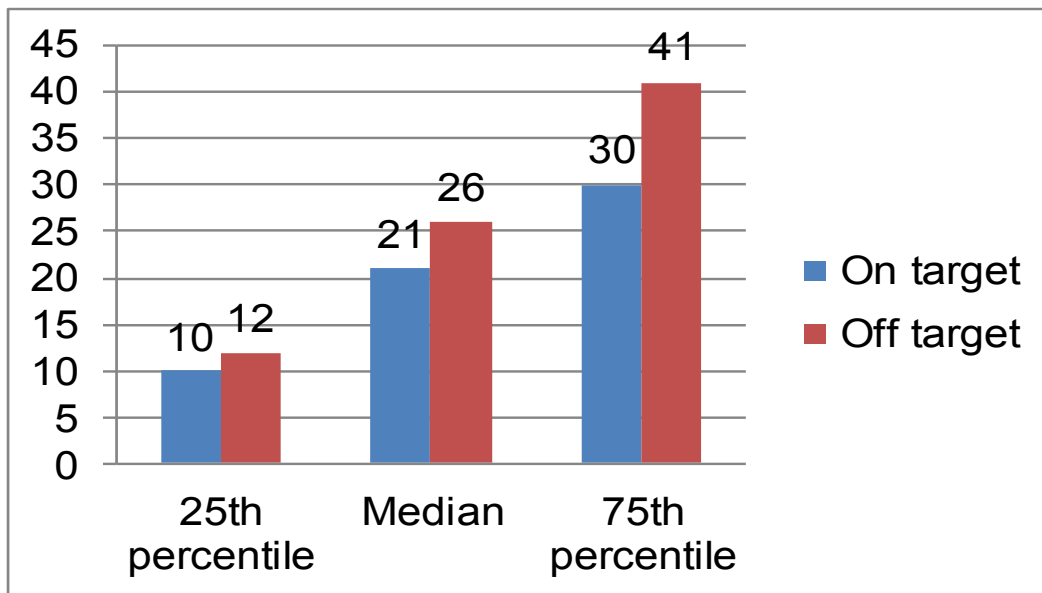
Level IV Trauma Centers experienced some variation in contacting EMS for transportation. In 50% of the On target cases, EMS was contacted in 2 minutes or less. For the Off target cases the median time for this action required ten minutes or less. The Off target cases experienced a greater variability in the 50th to 75th percentile to contact EMS.

Table 8: Transfer confirmation to EMS contact time (minutes) (N=282)

	Total cases	Missing	25th percentile	Median	75th percentile	Min	Max
On target	97	36	0	2	9	-111	75
Off target	185	75	0	10	35	-62	174

In transfers, hospitals should strive to quickly contact the most appropriate method of transport for their patients. Much like transfer plans with Level I Trauma Centers, facilities can develop a decision schematic for regular and extenuating circumstances. Hospitals should consider an internal review of cases that experienced delays in contacting EMS.

Table 7: EMS contact to arrival time (minutes) (N=282)



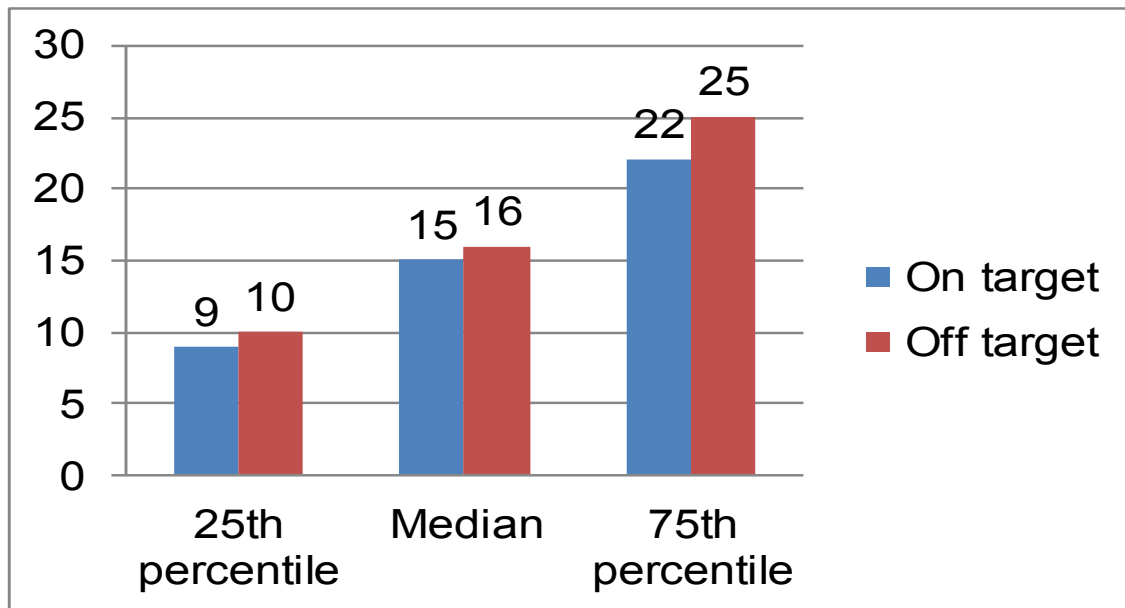
The median time from EMS contact to their arrival was slightly different between both groups. In the On target group, EMS arrived in 21 minutes or less in 50% of cases. In the Off target group, EMS arrived in 26 minutes of cases or less in 50% of cases. There was a difference of 15 minutes between the 50th to 75th percentile for the Off target group.

Table 9: EMS contact to arrival time (minutes) (N=282)

	Total cases	Missing	25th percentile	Median	75th percentile	Max
On target	97	25	10	21	30	114
Off target	185	58	12	26	41	240

Much like the transfer plans with the receiving centers, hospitals should consider collaborating with EMS agencies that provide inter-facility transfers.

Graph 8: EMS arrival to discharge time (minutes) (N=282)



The median time from EMS arrival to patient discharge was not very different between both groups. In 25% of cases, the Level IV Trauma Center required 9 minutes or less to transfer care to EMS. For 75% of cases, the On target and Off target groups transferred care in less than 22 and 25 minutes, respectively.

Table 10: EMS arrival to discharge time (minutes) (N=282)

	Total cases	Missing	25th percentile	Median	75th percentile	Min	Max
On target	97	15	9	15	22	-26	115
Off target	185	28	10	16	25	-34	60

In the On target group, there was a range of 141 minutes. Conversely, the Off target group had a range of 94 minutes. The negative minutes presented in the minimum column may reflect an EMS unit being stationed at the hospital.

Table 11: Median differences in time intervals (minutes) (N=282)

	≤2 hours	>2 hours	Median difference
	Median	Median	
Patient ED arrival to trauma team activation	10	10	0
Patient ED arrival to first physician contact	1	8	7
Physician contact to decision to transfer	35	117	82
Level IV outreach time to Level I confirmation	6	10	4
Level I confirmation time to EMS contact	2	10	8
EMS contact time to their arrival	21	26	5
EMS arrival to patient discharge	15	16	1
Total number of cases	97	185	*

*Unable to calculate, not related

Level IV Trauma Centers should focus on transfer decision after a patient is seen by a physician to reduce their ED dwell times. Hospitals are urged to define the trauma patient population that they care for. More importantly, Level IV Trauma Centers should recognize and quickly transfer the patients that require a higher level of care.

Table 12: Reasons for a delay as determined by Level IV Trauma Centers

	N
Bed Assignment	54
EMS availability	41
Lab/Radiological studies	80
Internal decision making	53

Level IV Trauma Centers had the option of selecting multiple reasons for a perceived delay. These results were not separated into On target and Off target groups. Although a transfer may have occurred in less than 2 hours, a provider may have recorded a delay.

Many centers felt that the *Lab/Radiological studies* and the *Bed assignment* caused a delay in discharging a patient. Hospitals should continuously monitor their subjective (i.e. delays) and objective (i.e. time intervals) indicators to determine best practices for their facility.